

Moving Forward in a Frosty Market

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February 9, 2016



Looking back five years

- **Wind power share in Sweden about 2%**
- **Stor-Rotliden wind farm just constructed**
- **Vattenfall's R&D programme started**
- **Limited understanding of icing**
- **Limited market for de/anti-icing**

Today

- Wind power share in Sweden more than 10%
- Juktan wind farm just constructed
- Vattenfall's R&D programme delivering
- The understanding of icing is improved greatly
- Most major suppliers can de/anti-icing equipment

Towards 2020..

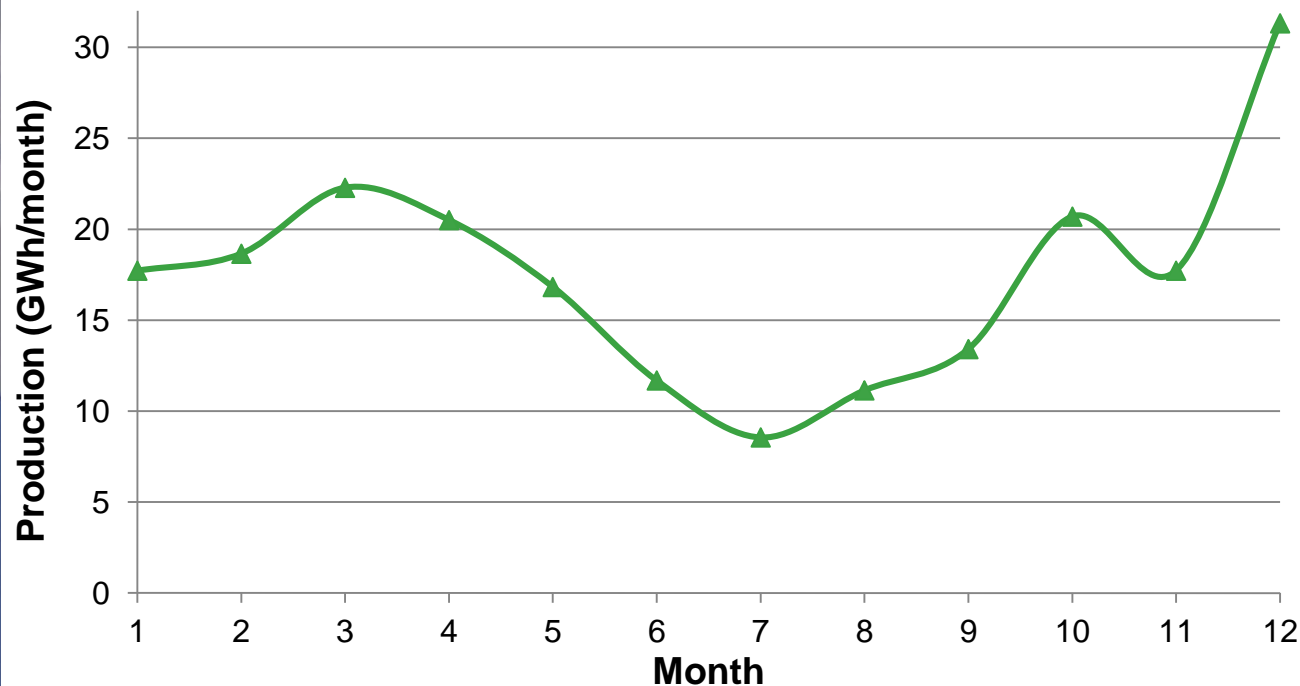
- Wind power share in Sweden is 15%?
- Vattenfall will invest 50 billion SEK in wind power!
- Vattenfall's R&D programme continues to be a success
- Further enhanced understanding
- Proven and warranted de/anti-icing solutions

What climate?

- Large-scale wind farms with a good wind resource
- Production profile during the year favourable
 - stronger wind speed
 - higher density of the air
 - better prices

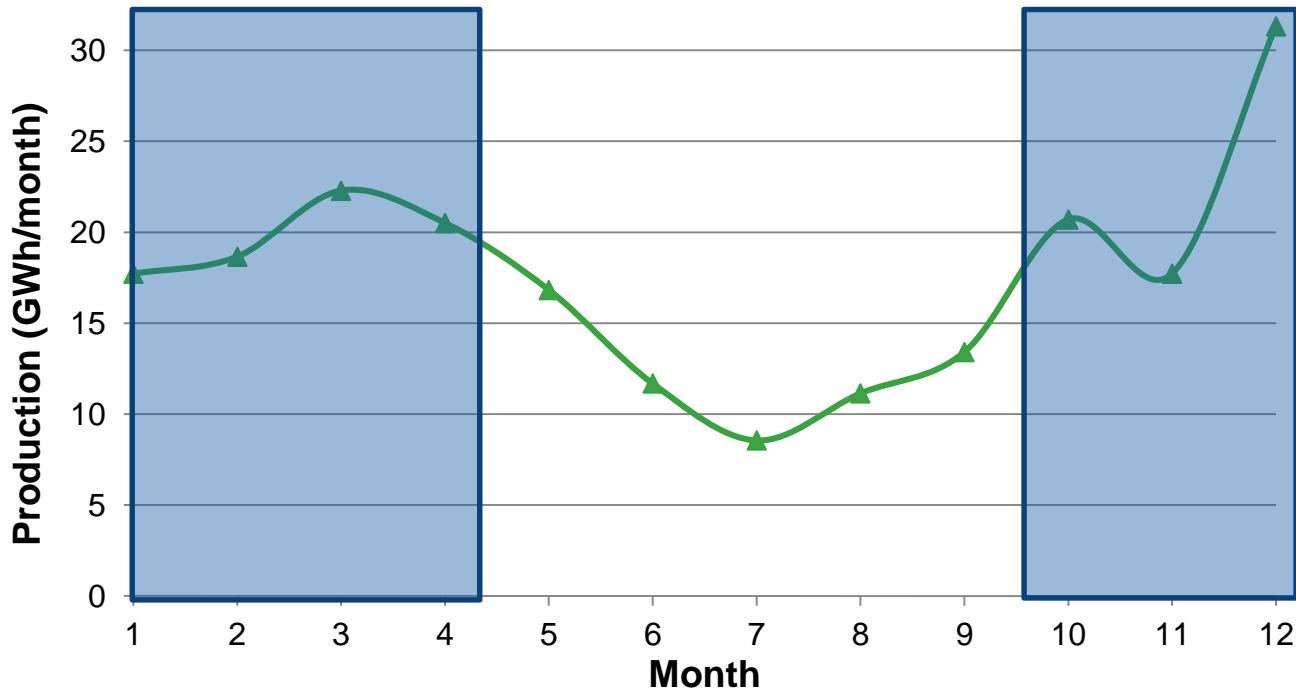
Stor-Rotliden – Production

Mean production 2014-2015

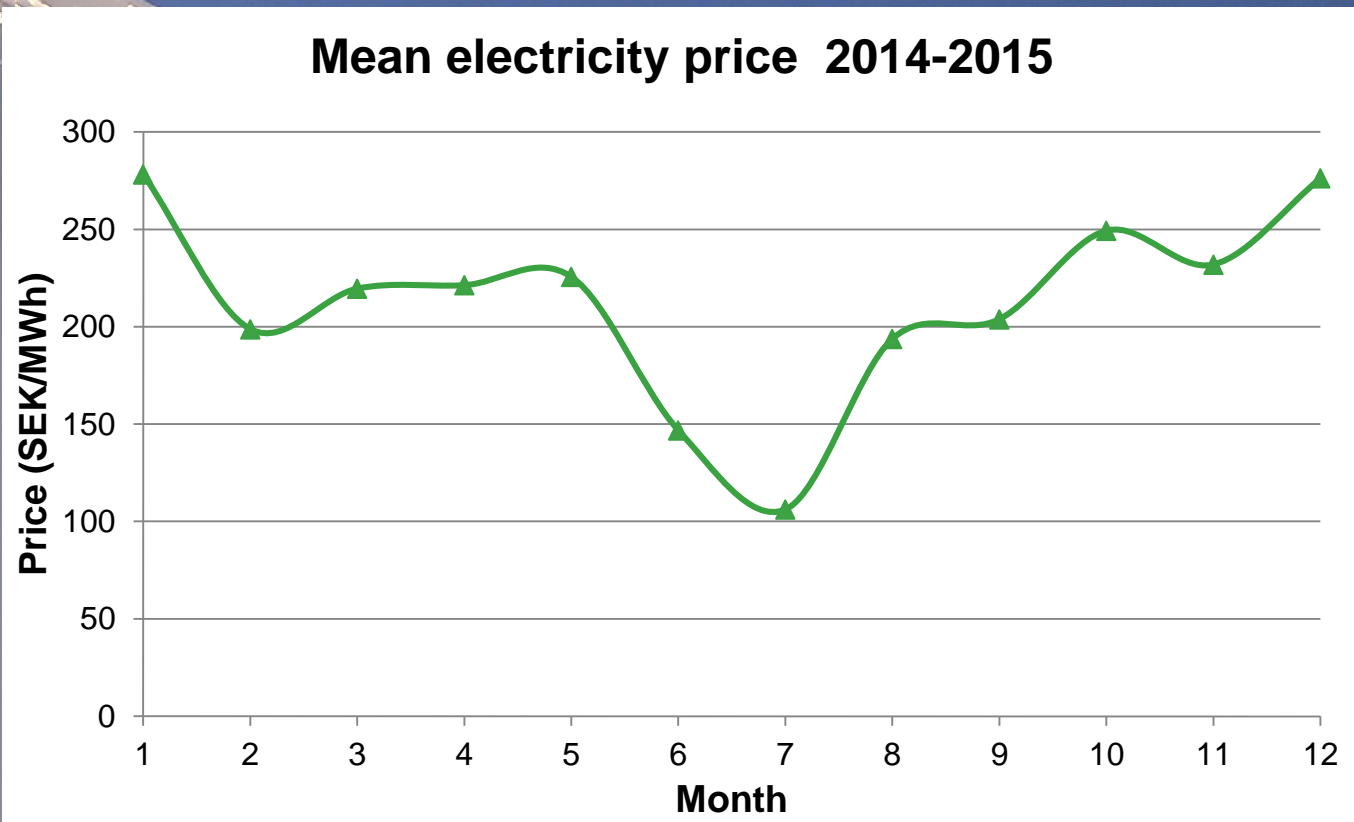


Stor-Rotliden – Production

Mean production 2014-2015

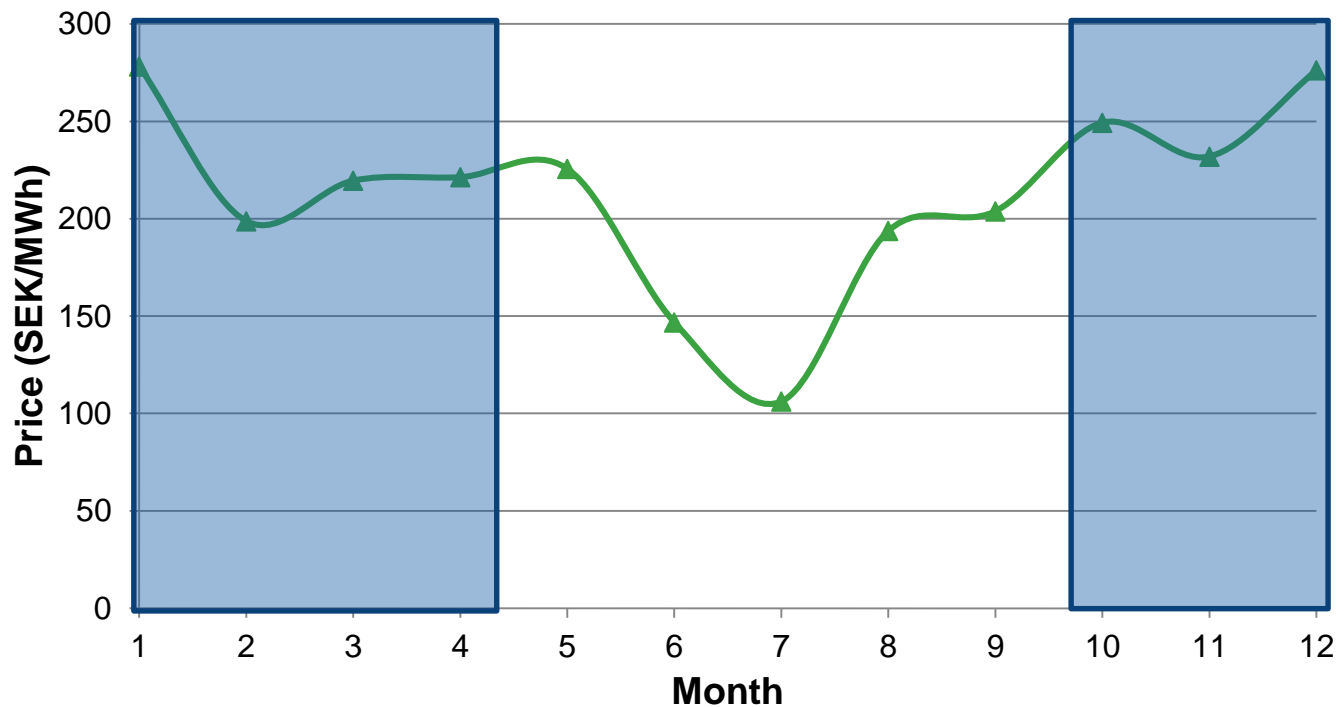


Stor-Rotliden – Price of electricity



Stor-Rotliden – Price of electricity

Mean electricity price 2014-2015



Research and Development efforts by Vattenfall

Ylva Odemark, Project Manager
Turbine Icing Programme



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